## REMARKS

Claims 1-30 are pending in the application. Claims 1-6, 16-17, 19 and 24-28 stand rejected under 35 U.S.C. 103(a) over U.S. Patent No. 6,259,085 to Holland ("Holland") in view of U.S. Patent No. 5,510,285 to Kim ("Kim"). Claims 7-13, 18 and 20-21 stand rejected under 35 U.S.C. 103(a) over Holland and Kim in further view of U.S. Patent No. 5,381,013 to Cox et al. ("Cox"). Claims 14-15 stand rejected under 35 U.S.C. 103(a) over Holland and Kim in view of U.S. Patent No. 5,262,633 to Kasai. Claims 22-23 stand rejected under 35 U.S.C. 103(a) over Holland, Kim, and Cox in further view of Kasai.

Applicants respectfully traverses the rejections and their underlying rationale in their entirety. In view of the following remarks, reconsideration and allowance are requested.

**Rejections under 35 U.S.C. 103(a)**

Issues:

I. Are Claims 1-6 and 16-17 properly rejected under 35 U.S.C. 103(a) over U.S. Patent No. 6,259,085 to Holland ("Holland") in view of U.S. Patent No. 5,510,285 to Kim ("Kim")?

II. Are Claims 19 and 24-28 properly rejected under 35 U.S.C. 103(a) over Holland in view of Kim?

III. Are Claims 7-13 and 18 properly rejected under 35 U.S.C. 103(a) over Holland and Kim in further view of U.S. Patent No. 5,381,013 to Cox et al. ("Cox")?

IV. Are Claims 20-21 properly rejected under 35 U.S.C. 103(a) over Holland and Kim in further view of Cox?

V. Are Claims 14-15 properly rejected under 35 U.S.C. 103(a) over Holland and Kim in view of U.S. Patent No. 5,262,633 to Kasai?

VI. Are Claims 22-23 properly rejected under 35 U.S.C. 103(a) over Holland, Kim, and Cox in further view of Kasai?

**Arguments**

I. Claims 1-6 and 16-17 are not properly rejected under 35 U.S.C. 103(a) over U.S. Patent No. 6,259,085 to Holland ("Holland") in view of U.S. Patent No. 5,510,285 to Kim ("Kim"). It is respectfully suggested that Claims 1-6 and 16-17 are not properly rejected in the final Office Action since the references do not teach all elements of the claims, and since there is no motivation to combine.

A. The references do not teach or suggest all of the elements of the claims.

Claim 1

Claim 1 is patentable over Holland and Kim at least because Holland and Kim do not teach or suggest "a grid of conducting wires proximate to and in electrical contact with the bias layer and configured to define an array of pixels corresponding to the array of doped gate regions; wherein the grid of conducting wires is configured to be electrically coupled to a voltage source and to distribute a bias voltage on the bias layer so as to bias the substrate with respect to the doped gate regions," as recited in Claim 1.

First, Kim does not teach a grid of conducting wires proximate to and in electrical contact with a bias layer, as recited in Claim 1.

The OSM2 lines of Kim do not form a grid. As shown in Figure 6, OSM2 are a series of vertical lines that each connect to different transfer gates (through vias 7 of Figure 6; note the changing pattern of vias for each different OSM2). Applicants find no teaching or suggestion in Kim that any of the OSM2 lines connect to each other electrically.

Kim teaches that each OSM2 provides optical shielding for parts of the CCD system except for the photodiode regions (see, e.g., column 5, lines 9-14 of Kim). Each of the OSM2 structures also provide electrical contact to one or more transfer gate electrodes receiving the same clock signal. (see, e.g., column 7, lines 1-6 of Kim). That is, a particular OSM2 line would connect transfer gate electrodes receiving the $V\varphi 1$ clock signal, a different OSM2 would connect transfer gate electrodes receiving the $V\varphi 2$ signal, and so forth.

Furthermore, Kim does not show that different OSM2 lines coupling groups of transfer gate electrodes receiving the same clock signal being electrically connecting. FIG. 7f of Kim shows a BB' cross section of FIG. 6. It appears to Applicants that the OSM2 regions to the left side of the figure and to the right side of the figure couple the respective transfer gate electrode

to the same clock signal. Although it may be possible to connect these two OSM2 regions, Applicants fail to see a teaching in Kim that these OSM2 regions are connected. That is, Applicants find no description of forming such interconnections, and sees no such interconnection in the figures.

The three OSM2 regions between the two outermost OSM2 regions couple different clock signals to different groups of transfer gate electrodes. Again, Applicants do not see a description of interconnecting any of these OSM2 lines to other OSM2 lines.

For at least these reasons, Applicants believe that Kim neither teaches nor suggests a grid of wires as recited in Claim 1.

Second, the OSM2 are not proximate to and in electrical contact with a bias layer as recited in Claim 1. Instead, the OSM2 "connect between transfer gates having the same clock signals applied thereto of the transfer gates PG1 to PG4 formed repeatedly." (See, e.g., column 5, lines 5-8 of Kim). Holland does not remedy the deficiencies of Kim. Since the references fail to teach or suggest these features of the independent claim, Claim 1 is patentable over Holland and Kim, alone or in combination.

B. Modifying Kim to include such a grid is not obvious since it renders Kim unsuitable for its intended purpose.

Further, it is not obvious to modify Kim to include such a grid. It is well known to those in the art that a grid of wires electrically connected on a semiconductor substrate would make the wires on the grid have substantially the same potential. If Kim were modified to include a grid of wires electrically connected to various clock signals (e.g., Vφ1, Vφ2, etc.) then such an electrical connection could render Kim unsuitable for its intended purpose, since all of the distinct clock signals would be forced to have the same potential. Moreover, such an electrically connected grid of wires would not allow Kim to select only certain photo diode regions (see Col. 7, lines 1-6). A modification that renders the cited prior art unsuitable for its intended purpose is not obvious (MPEP 2143.01).

Providing such a grid leads to a number of advantages. For example, the application notes the following highlighted advantages of the conducting grid wire feature in an exemplary embodiment (page 7, lines 25-31; page 8, lines 1-5):

The grid of conducting wires 122 provides several **functions and benefits** in addition to defining pixels for the photodiode array 100. The conducting wires 122 are connected to a voltage source to distribute a bias electrical potential on the conducting bias electrode layer or external back contact layer 106. Since the conducting wires 122 are distributed over the entire BEL or external back contact 106 and enclose each pixel, **this configuration enhances the uniformity of the bias voltages applied to the individual photodiodes, thereby improving the uniformity in the photo responses of photodiodes** if all other conditions are equal.

The grid of conducting wires 122 provides a low-resistance path from the power source to each photodiode. Since the internal noise generated at each photodiode and the disturbances (interference) received by each photodiode are approximately proportional to the resistance associated with each photodiode, **the use of the grid of the conducting wires 122 reduces the noise and improves the immunity to external interference.**

The above-mentioned advantages of the electrically connected grid of wires are neither obvious nor apparent from simply combining the cited references as suggested in the Office Action. When combining the cited references, such advantages are apparent only in hindsight, which is not permitted for a 35 U.S.C. 103 rejection (MPEP 2142).

C. The Office Action fails to meet its prima facie burden for showing a motivation to combine the references.

Additionally, the Office Action fails to meet its prima facie burden for showing a motivation to combine the references. The Office Action states "It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the charge coupled device of Holland by incorporating conducting wires to form electrical connections to the electrodes as taught by Kim." (See page 3 of the Office Action.)

No motivation to combine the references is given. The above statement is merely a conclusion, supported by no evidence in the references whatsoever. Because of this lack of evidence, it appears that the rejections are based on hindsight and use the teaching of this

application rather than that of the cited references to selectively combine different parts of the references. Such a conclusory statement does not meet the prima facie burden under 35 U.S.C. 103(a).

More specifically, the Federal Circuit requires that "When patentability turns on the question of obviousness, the search for and analysis of the prior art includes evidence relevant to the finding of whether there is a teaching, motivation, or suggestion to select and combine the references relied on as evidence of obviousness." *In Re Sang-Su Lee, 277 F.3d 1338, 1343 (Fed. Cir. 2002).* Further, "particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed." Id. That is, to meet its burden of prima facie obviousness, the Office Action must provide particular findings that a person skilled in the art would use to select the particular components of the references for combination. The motivation to combine must not come from Applicants' specification.

At least because (1) neither Holland nor Kim teaches the above features of Claim 1, (2) modifying Kim to include such a grid would render Kim unsuitable for its intended purpose, and (3) there is no motivation to combine the references, Claim 1 is patentable over Holland and Kim, alone or in combination.

Claims 2-6 and 16-17 depend upon Claim 1. Since Claim 1 is allowable, then Claims 2-6 and 16-17 are also allowable and patentable for at least the same reasons as stated above and for reciting allowable subject matter in their own right. Independent consideration and allowance of the dependent claims are respectfully requested.

II. Claims 19 and 24-28 are not properly rejected under 35 U.S.C. 103(a) over Holland in view of Kim.

It is respectfully suggested that Claims 19 and 24-28 are not properly rejected in the Office Action. In particular, Claim 19 is patentable for at least the same reasons as stated above with respect to Claim 1 since Claim 19 recites features similar to those of Claim 1.

Claim 19 is further patentable for the limitation below:

"wherein the grid of conducting wires if further configured to distribute a **common potential** to the photodiodes."

As stated above for the rebuttal of the suggestion in the Office Action that Kim (allegedly) teaches a grid of wires, Kim **does not teach a common potential** to the photodiodes. Since Kim does not teach either of these claim limitations, the features of Kim cannot be combined with Holland to form a proper 35 U.S.C. 103(a) rejection for Claim 19. Therefore, Claim 19 is in condition for allowance.

Since Claim 19 is allowable, dependent Claims 24-28 are also allowable for at least the same reasons as stated above.

III. Claims 7-13 and 18 are not properly rejected under 35 U.S.C. 103(a) over Holland and Kim in further view of U.S. Patent No. 5,381,013 to Cox et al. ("Cox").

It is respectfully suggested that Claims 7-13 and 18 are not properly rejected in the Office Action. In particular, Claim 7 is patentable for at least the same reasons as stated above with respect to Claim 1 since Claim 7 depends upon Claim 1.

Claim 7 is further patentable for at least the reason that **none of the references teach or suggest** "a scintillation array comprising scintillation elements ... wherein the scintillation array includes optically reflective surfaces disposed between the scintillation elements to optically isolate one scintillation element from another," as recited in Claim 7.

The Office Action asserts that the scintillator array of Claim 7 is an obvious modification to the scintillator of Cox. Applicants respectfully disagree. St. Regis Paper Co. v. Bemis Co., cited in the Office Action, does not so teach. Instead, St. Regis Paper Co. held that multiple layering in a bag did not provide the necessary "synergy" necessary to patentability. *St. Regis Paper at 549 F.2d 833, 838 (1977).* St. Regis Paper does not stand for the blanket proposition that duplicating an element is not obvious, and has been held to be "heavily fact dependent" in Ex Parte Yutaka Urino and Tomoki Saito, Board of Patent Appeals and Interferences Appeal No. 96-0346 *(Bd.Pat.App & Interf. 1996, not published).* Moreover, the technical line of reasoning for suggesting that the scintillator array of Claim 7 is an obvious modification to the scintillator

of Cox has not been supported simply because the references allegedly are in a similar field (e.g., semiconductors) (MPEP 2144.03).

Rather than merely duplicating a single scintillator (e.g., a scintillator as shown in Cox in Fig. 7), Claim 7 includes **additional elements**. For example, Claim 7 includes (1) optically reflective surfaces disposed between the scintillation elements to optically isolate one scintillation element from another, and (2) recites that the scintillation elements are aligned with and optically coupled to a corresponding one of the array of pixels.

Thus, providing a scintillator array is not so simple as mere duplication. The scintillator in the application differs from the scintillator of Cox. For example, in the implementation shown in FIG. 3 of the current application and described on page 8, the scintillator crystal is (1) segmented with trenches 320, and (2) the scintillator array is fabricated to align the segments defined by trenches 320 with the pixels of the photodiode array 100.

For at least these additional reasons, Claim 7 is patentable over Holland, Kim, and Cox, alone or in combination. Therefore, it is further respectfully suggested that Claims 8-13 and 18 are not properly rejected in the Office Action since these claims depend on the allowable claims of Claim 1 and 7. As previously stated, the rejected dependent claims are allowable for the reasons that their respective independent claim is allowable and for reciting allowable subject matter in their own right. Independent consideration and allowance of the dependent claims are respectfully requested.

IV. Claims 20-21 are not properly rejected under 35 U.S.C. 103(a) over Holland and Kim in further view of Cox.

It is respectfully suggested that Claims 20-21 are not properly rejected in the Office Action. Claims 20-21 are patentable for at least the same reasons as stated above with respect to Claim 19 since Claims 20-21 depend upon Claim 19.

Claim 20 is further patentable for the reason that none of the references teach or suggest the combined features of "each of said scintillation elements **aligned with** and **optically coupled** to a corresponding one of the array of pixels, and wherein the scintillation array **includes optically reflective surfaces** disposed between the scintillation elements to optically isolate one

scintillation element from another." As stated above for similar features and reasons in Claim 7 and 19 , Claim 20 is patentable over Holland, Kim, and Cox, alone or in combination.

Claim 21 is patentable since it depends upon an allowable claim, Claim 20, and has allowable subject matter in its own right.

V. Claims 14-15 are not properly rejected under 35 U.S.C. 103(a) over Holland and Kim in view of U.S. Patent No. 5,262,633 to Kasai.

It is respectfully suggested that Claims 14-15 are not properly rejected in the Office Action. Claims 14-15 are patentable for at least the same reasons as stated above with respect to Claims 1 and 7 since Claims 14-15 depend upon Claims 1 and 7.

VI. Claims 22-23 are not properly rejected under 35 U.S.C. 103(a) over Holland, Kim, and Cox in further view of Kasai.

It is respectfully suggested that Claims 22-23 are not properly rejected in the Office Action. Claims 22-23 are patentable for at least the same reasons as stated above with respect to Claim 19 since Claims 22-23 depend upon Claim 19.

## CONCLUSION

Applicants believe that Claims 1-30 are in condition for allowance and ask that those pending claims be allowed. A formal notice to that effect is respectfully solicited.

The foregoing comments made with respect to the positions taken by the Examiner are not to be construed as acquiescence by the Applicants with other positions of the Examiner that have not been explicitly contested. Accordingly, Applicants' arguments for patentability of a claim should not be construed as implying that there are not other valid reasons for patentability of that claim or other claims.

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Respectfully submitted,

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Dwight U. Thompson
Reg. No. 53,688

USPTO Customer No.: 20985
Fish & Richardson P.C.
4350 La Jolla Village Drive, Suite 500
San Diego, California 92122
Telephone: (858) 678-5070
Facsimile: (858) 678-5099

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